

WHAT IS CLAIMED IS:

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5 1. A wafer polishing head for planarizing a wafer, comprising:
a carrier for loading the wafer;
a wafer adhering layer disposed beneath the carrier;
a retaining ring surrounding the carrier and the wafer adhering layer;
a first pressure chamber having a first inner pressure disposed above the retaining ring;
a second pressure chamber having a second inner pressure disposed on the carrier, wherein a relative height between the retaining ring and the carrier can be adjusted by changing the first and the second inner pressure; and
10 an automatic control system respectively coupled to the first pressure chamber and the second pressure chamber and for adjusting a relative height between the carrier and the retaining ring, wherein the automatic control system receives a first feedback pressure signal and transmitted from the first pressure chamber and a second feedback pressure signal and transmitted from the second pressure chamber while a chemical-
15 mechanical polishing process is performed, and the automatic control system respectively transmits a first pressure value and a second pressure value to the first pressure chamber and the second pressure chamber.

20 2. The wafer polishing head of claim 1, wherein the automatic control system comprises:

a controller;
a counter coupled to the controller;
a first converter coupled to the first pressure chamber and the controller, wherein the first converter receives the first feedback pressure signal while the chemical-

mechanical polishing process is performed and transforms the first feedback pressure into a first feedback digital signal. and the first feedback digital signal is transmitted into the controller:

5 a second converter coupled to the second pressure chamber and the controller, wherein the second converter receives the second feedback pressure signal while the chemical-mechanical polishing process is performed and transforms the second feedback pressure into a second feedback digital signal, and the second feedback digital signal is transmitted into the controller;

10 a first regulator coupled to the controller and the first pressure chamber, wherein the first regulator receive a first digital signal transmitted from the controller and transform the first digital signal into the first pressure value; and

15 a second regulator coupled to the controller and the second pressure chamber, wherein the second regulator receive a second digital signal transmitted from the controller and transform the second digital signal into the second pressure value

3. The wafer polishing head of claim 2, wherein the first and the second converters can be analog/digital (A/D) converters.

4. The wafer polishing head of claim 1, wherein the second pressure chamber is partly filled by a liquid with a relatively low volatility and a relatively low chemical reactivity.

20 5. The wafer polishing head of claim 1, wherein the first feedback pressure signal denotes the first inner pressure.

6. The wafer polishing head of claim 1, wherein the second feedback pressure signal denotes the second inner pressure.

7. A wafer polishing head for planarizing a wafer, comprising:

a carrier for loading the wafer;
a retaining ring surrounding the carrier;
a first pressure chamber having a first inner pressure disposed above the retaining
ring;
5 a second pressure chamber having a second inner pressure disposed on the carrier;
and
an automatic control system respectively coupled to the first pressure chamber and
the second pressure chamber.

8. The wafer polishing head of claim 7, wherein the automatic control system
comprises:

a controller;
a first converter coupled to the first pressure chamber and the controller;
a second converter coupled to the second pressure chamber and the controller;
a first regulator coupled to the controller and the first pressure chamber; and
a second regulator coupled to the controller and the second pressure chamber.

9. The wafer polishing head of claim 8, wherein the first and the second
converters can be analog/digital (A/D) converters.

10. The wafer polishing head of claim 8, wherein the automatic control system
further comprises a counter coupled to the controller.

20 11. The wafer polishing head of claim 7, wherein the second pressure chamber is
partly filled by a liquid possesses a relatively low volatility and a relatively low
chemical reactivity.

